Patent claims:

1. A process for the determination of the internal pressure, particularly of the minimum pressure of the vehicle tire of a motor vehicle during driving operation, through an analysis of the characteristic vibration behavior of the wheel, whereby the amplitude maxima of the resonance frequency are observed from the vibration spectrum determined, **characterized by** the following steps:

   a) Determination and recording of the resonance frequency of the wheel with a preset theoretical pressure;

   b) Determination and storing in memory of the gradients $_{\text{1Theoretical}}$, $_{\text{2Theoretical}}$ of the frequency curve above and below the resonance;

   c) Formation of the ratio $_{\text{Theoretical}}$ from the gradients $_{\text{1Theoretical}}$ and $_{\text{2Theoretical}}$;

   d) Continuous determination of the resonance frequency of the wheel in the driving operation;

   e) Continuous determination of the gradients $_{\text{1Actual}}$, $_{\text{2Actual}}$ of the frequency curve above and below the resonance;

   f) Formation of the ratio from the gradients $_{\text{1Actual}}$, $_{\text{2Actual}}$;

   g) Continuous comparison of the ratios $_{\text{Actual}}$ and $_{\text{Theoretical}}$ with each other;

   h) Production of a signal if the divergence from $_{\text{Actual}}$ to $_{\text{Theoretical}}$ exceeds a defined value.

2. A process for the determination of the internal pressure, particularly of the minimum pressure of the vehicle tire of a motor vehicle during driving operation, through an analysis of the characteristic vibration behavior of the wheel, whereby the amplitude maxima of the resonance frequency are observed from the vibration spectrum determined, **characterized by** the following steps:

   a) Determination and recording of the resonance frequency of the wheel with a preset theoretical pressure;

   b) Determining the xdB-, particularly the 3 dB cut-off frequency $f_{G1Theoretical}$, $f_{G2Theoretical}$ of the maxima;

   c) Forming and storing in memory of the difference frequency $f_{GTheoretical}$ from the higher xdB cut-off frequency $f_{G2Theoretical}$ and the lower xdB cut-off frequency $f_{G1Theoretical}$;

   d) Continuous determination of the resonance frequency of the wheel during the driving operation;

   e) Continuous determination of the xdB-, particularly the 3 dB cut-off frequencies $f_{G1Actual}$, $f_{G2Actual}$ of the maxima during the driving operation;

   f) Formation of the difference frequency $f_{GActual}$ from the higher xdB cut-off frequency $f_{G2Actual}$ and the lower xdB cut-off frequency $f_{G1Actual}$;

   g) Continuous comparison of the difference frequencies $f_{GTheoretical}$ and $f_{GActual}$ with each other;

   h) Production of a signal if the divergence from $f_{GActual}$ to $f_{GTheoretical}$ exceeds a defined value.

3. A process for the determination of the internal pressure, particularly of the minimum pressure of the vehicle tire of a motor vehicle during driving operation, through an analysis of the characteristic vibration behavior of the wheel, whereby the amplitude maxima of the resonance frequency are observed from the vibration spectrum determined, **characterized by** the following steps:

    a) Determination and recording of the resonance frequency of the wheel with a preset theoretical pressure;

    b) Determination and storing in memory of the maximum amplitude value $a_{Theoretical}$ at the theoretical pressure of the tire;

    c) Continuous determination of the resonance frequency of the wheel in the driving operation;

    d) Continuous determination of the maximum amplitude value a_{Actual};

    e) Continuous comparison of the maximum amplitude value $a_{Theoretical}$ and a_{Actual} with each other;

    f) Production of a signal if the divergence from a_{Actual} to $a_{Theoretical}$ exceeds a defined value.

4. A process for the determination of the internal pressure, particularly of the minimum pressure of the vehicle tire of a motor vehicle during driving operation, through an analysis of the characteristic vibration behavior of the wheel, whereby the resonance frequency is observed from the vibration spectrum determined, **characterized by** the following steps:

a) Determination and recording of the frequency spectrum of the wheel with a preset theoretical pressure and determination of the approximate position of the resonance frequency;

b) Transformation of the differential equations describing the vibration behavior of the wheel:

- by means of Laplace- or Fourier transformation;

c) Selection of a range $f_{Theoretical}$ around the approximate position of the resonance frequency $f_{Theoretical}$;

d) Correlation of the selected range $f_{Theoretical}$ with the transformed differential equations;

e) Computation of the rotational rigidity $c_{s,\ Theoretical}$ and of the rotational damping $d_{s,\ Theoretical}$;

f) Continuous determination of the frequency spectrum of the wheel in the driving operation and determination of the approximate position of the resonance frequency f_{Actual};

g) Selection of a range f_{Actual} around the approximate position of the resonance frequency f_{Actual};

h) Correlation of the selected range f_{Actual} of the determined resonance frequency f_{Actual} with the transformed differential equations for the determination of the rotational rigidity $c_{s,\ Actual}$ and of the rotational damping $d_{s,\ Actual}$;

i) Formation of the difference of $c_{s,\ Theoretical}$ and $c_{s,\ Actual}$, and of the difference from $d_{s,\ Theoretical}$ and $d_{s,}$

$_{Actual}$ and the production of a signal, if at least one of the differences exceeds a defined value.

5. A process for the determination of the internal pressure, particularly of the minimum pressure of the vehicle tire of a motor vehicle during driving operation, through an analysis of the characteristic vibration behavior of the wheel, whereby the resonance frequency is observed from the vibration spectrum determined, **characterized by** the following steps:

   a) Determination of the internal tire pressures $p_{Theoretical}(c_{s,\ Theoretical},\ d_{s,\ Theoretical})$ in the theoretical condition in dependence on the rotational rigidity c_s and the rotational damping d_s, whereby parameters that take into account the tires that are typical for the specific vehicle are referred to in this connection;

   b) Determination of the internal tire pressures p_{Actual} $(c_{s,\ Actual},\ d_{s,\ Actual})$ in the actual condition in dependence on the rotational rigidity c_s and the rotational damping d_s, whereby parameters are referred to in this connection that take into account the tires that are typical for the specific vehicle;

   c) Formation of the difference from $p_{Theoretical}$ and p_{Actual} and production of a signal if the difference exceeds a defined value.

6. A process in accordance with one of the claims 1 to 5, **characterized in that,** the signal is only produced if the divergence exceeds the defined value over a set period of time.

7. A process in accordance with claim 1, **characterized in that,** the gradients $_{1Theoretical}$, $_{2Theoretical}$ below and above the resonance are, at theoretical pressure, determined externally for one specific type of tire and are stored in memory on a memory storage medium that can be connected with the tire.

8. A process in accordance with claim 2, **characterized in that,** the xdB cut-off frequencies $f_{G1Theoretical}$, $f_{G2Theoretical}$ of the maxima, at theoretical pressure, are determined externally for one specific type of tire and are stored in memory on a memory storage medium that can be connected with the tire.

9. A process in accordance with claim 3, **characterized in that,** the maximum amplitude value $a_{Theoretical}$, at theoretical pressure, is determined externally for one specific type of tire and is stored in memory on a memory storage medium that can be connected with the tire.

10. A process in accordance with claim 4 or 5, **characterized in that,** the first correlation of the transformed differential equations with the transformed natural frequency curve $f_{Theoretical}$ for the determination of the internal tire pressure $p_{Theoretical}$ or the rotational rigidity c_s and the rotational damping d_s is determined externally for one specific type of tire and stored in memory in a memory storage medium that can be connected with the tire.

11. A process in accordance with one of the claims 7 to 10, **characterized in that,** the memory storage medium is a transponder.

12. A process in accordance with one of the claims 7 to 10, **characterized in that,** the memory storage medium is a bar code.

13. A process in accordance with one of the claims 1 to 5, **characterized in that,** outside influences brought about by the load, the temperature, the humidity, the ambient air pressure, and/or the acceleration of the vehicle can be compensated for in the assessment of the frequency curve in the driving operation.

14. A process in accordance with one of the claims 1 to 5, **characterized in that,** the depth of the profile of the tire is taken into consideration in the assessment of the frequency curve in the driving operation.

15. A process in accordance with one of the claims 1 to 5, **characterized in that,** a calibration dependent on the speed of the motor vehicle is carried out on the moving motor vehicle with the help of an initialization device.

16. A process in accordance with one of the claims 1 to 5, **characterized in that,** the conversion from the time range to the frequency range is carried out by means of tables.

17. A process in accordance with claim 3, **characterized in that,** the dimension of the tire is recognized through the situation of the maximum amplitude values a_{Actual}.

18. A process in accordance with one or more of the above claims, **characterized by** the coupling with an indirect system for the detection of the minimum air pressure.

19. The use of at least one of the processes 1 to 5 in a direct and/or indirect tire pressure monitoring system.